**ABSTRACT OF THE DISCLOSURE**

In a laser processing method for accurately forming a convexo-concave structure on the surface of a glass substrate, a periodic optical intensity distribution of a laser beam is obtained by an interference between diffracted light beams of +1 degree and -1 degree emitted from a phase mask, onto which the laser beam is irradiated, in the vicinity of the emission side of the phase mask, and a glass substrate, on which a thin film is formed, is set in the area where the periodic optical intensity distribution is provided. As a result, the thin film is evaporated or ablated depending on the periodic optical intensity, thereby a diffraction grating, which has the same period as that of the varying optical intensity, is formed on the glass substrate.